

## REMARKS

This is intended as a full and complete response to the Office Action dated May 31, 2007, having a shortened statutory period for response set to expire on August 31, 2007. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1, 3, 4, 6-13, 15-18, 20, 21, 23-30, 32, 33 and 50-59 remain pending in the application and are shown above. Claims 1, 3, 4, 6-13, 15-18, 20, 21, 23-30, 32, 33 and 50-59 stand rejected by the Examiner. Reconsideration of the rejected claims is requested for reasons presented below.

### ***Claim Rejections – 35 U.S.C. § 103***

Claims 1, 3-4, 6-7, 17-18, 20 and 23-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Toprac* (U.S. Patent No. 6,379,980) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677) as evidenced by *Wilby* (U.S. Publ. No. 2003/0141572). The Examiner asserts that the combined references teach all the elements of claims 1, 3-4, 6-7, 17-18, 20, and 23-24, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. In particular, the Examiner states that *Payne* discloses a “special filter to remove outliers (erroneous data points lying outside good data points).” The Examiner also states that *Knoot* discloses “a modulation frequency of 10 Hz.” The Applicant respectfully traverses the rejection.

The Examiner admits that *Toprac* does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. *Payne* discloses use of a logarithmic correction and smoothing algorithm to remove noise from a photographic image (col. 4, lines 28-36). *Payne* does not disclose use of an outlier filter to remove outliers in pre-etch measurement information. *Knoot* discloses a signal generator varying at about 2-10 Hz coupled to a power supply for a bank of lamps (col. 7, lines 45-46; col. 6, lines 13-15). *Knoot* does not disclose modulating the intensity of

radiation directed onto a substrate at a frequency of about 10 Hz. Yonezawa, Shoham, Egermeier, and Wilby also do not cure the deficiencies of Toprac, Payne, and Knoot.

The Applicant submits that the references, alone or combined, do not teach, show, or suggest performing pre-etch measurements of a substrate to generate pre-etch measurement information, applying an outlier filter to remove outliers in the pre-etch measurement information, analyzing the pre-etch measurement information to determine that a patterning is of a sufficient quality to allow for etching of the substrate, providing the substrate along with the pre-etch measurement information to an etch reactor, etching the substrate in the etch reactor using an etch process, wherein the pre-etch measurement information in combination with etch process monitoring are used to monitor an etch process endpoint, wherein the etch process monitoring comprises directing radiation onto the substrate, wherein an intensity of the radiation is modulated at a frequency of about 10 Hz, and collecting a portion of the radiation reflected from the substrate, and terminating the etch process based on the etch process monitoring having identified that the etch process has reached the etch process endpoint as recited by claim 1 and claims dependent thereon.

Also, the references, alone or combined, do not teach, show, or suggest performing pre-etch measurements of a substrate having a mask thereon to generate pre-etch measurement information of such mask, applying an outlier filter to remove outliers in the pre-etch measurement information, analyzing the pre-etch measurement information to determine that the mask is of a sufficient quality to allow for etching of the substrate, providing the substrate along with the pre-etch measurement information to an etch reactor, trimming the mask using an etch process, wherein the pre-etch measurement information in combination with etch process monitoring are used to monitor the trimming the mask, wherein the etch process monitoring comprises directing radiation onto the substrate, wherein an intensity of the radiation is modulated at a frequency of about 10 Hz, and collecting a portion of the radiation reflected from the substrate, and terminating the trim process when the etch process monitoring indicates that the mask has been trimmed to pre-determined dimensions as recited in claim 18 and claims dependent thereon.

Withdrawal of the rejection is respectfully requested.

Claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, 23-26, 28-30 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Klippert II et al* (U.S. Patent No. 6,136,712) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677). The Examiner asserts that the combined references teach all the elements of claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, and 23-26, 28-30, and 32, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that *Klippert II* does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither *Payne* nor *Knoot* overcomes the deficiency of *Klippert II*. Also, *Yonezawa*, *Shoham*, and *Egermeier* do not cure the deficiencies of *Klippert I*, *Payne*, and *Knoot*.

The Applicant submits that, as stated above, the references, alone or in combination, do not teach, show, or suggest each and every element recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, 23-26, 28-30 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Petrucchi et al* (WO 01/24254) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677). The Examiner asserts that the combined references teach all the elements of claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, and 23-26, 28-30, and 32, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that *Petrucchi* does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither *Payne* nor *Knoot* overcomes the deficiency of *Petrucchi*. Also,

Yonezawa, Shoham, and Egermeier do not cure the deficiencies of Petrucci, Payne, and Knoot.

The Applicant submits that, as stated above, the references, alone or combined, do not teach, show, or suggest each and every element recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, 23-26, 28-30 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Grimbergen et al* (U.S. Patent No. 6,390,019, hereinafter "Grimbergen") in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677). The Examiner asserts that the combined references teach all the elements of claims 1, 3-4, 6-9, 11-13, 15, 17-18, 20, and 23-26, 28-30, and 32, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that Grimbergen does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither Payne nor Knoot overcomes the deficiency of Grimbergen. Also, Yonezawa, Shoham, and Egermeier do not cure the deficiencies of Grimbergen, Payne, and Knoot.

The Applicant submits that, as stated above, the references, alone or combined, do not teach, show, or suggest each and every element recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 10, 20 and 27 are rejected under 35 U.S.C. § 102(b) as being unpatentable over *Toprac* (U.S. Patent No. 6,379,980) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677) as applied to claims 1, 3-4, 6-7, 17-18, 20 and 23-24 and further in view of *Yu* (U.S. Patent No. 6,368,982). The Examiner asserts that the combined references teach all the elements of claims 10, 20, and 27, and that it would

have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that none of the cited references alone teaches each and every element of claim 10, 20, or 27, as required by 35 U.S.C. § 102(b). Moreover, the Examiner admits that Toprac does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither Payne nor Knoot overcomes the deficiency of Toprac. Also, Yonezawa, Shoham, Egermeier, and Yu do not cure the deficiencies of Toprac, Payne, and Knoot.

The Applicant submits that, as stated above, the references, alone or combined, do not teach, show, or suggest each and every element recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 16 and 33 are rejected under 35 U.S.C. § 102(b) as being unpatentable over *Grimbergen et al* (U.S. Patent No. 6,390,019) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677) as applied to claims 1, 3-4, 6-9, 11-13, 15, 17-20, 23-26, 28-30 and 32 and further in view of *Grimbergen et al* (U.S. Patent No. 6,406,924, hereinafter "Grimbergen II"). The Examiner asserts that the combined references teach all the elements of claims 16 and 33, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that none of the cited references alone teaches each and every element of claim 16 or 33, as required by 35 U.S.C. § 102(b). Moreover, the Examiner admits that Grimbergen does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither Payne nor Knoot overcomes the deficiency of Grimbergen. Also, Yonezawa, Shoham, Egermeier, and Grimbergen II do not cure the deficiencies of Grimbergen, Payne, and Knoot.

The Applicant submits that, as stated above, the references, alone or combined, do not teach, show, or suggest each and every element recited in claims 1 and 18, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claim 21 is rejected under 35 U.S.C. § 102(b) as being unpatentable over *Toprac* (U.S. Patent No. 6,379,980) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and *Yonezawa et al* (U.S. Publ. No. 2003/0222231) or *Shoham et al* (U.S. Publ. No. 2004/0028267) or *Egermeier et al* (U.S. Publ. No. 2002/0006677) as applied to claims 1, 3-4, 6-7, 17-18, 20 and 23-24 and further in view of *Cha et al* (U.S. Patent No. 6,319,767). The Examiner asserts that the combined references teach all the elements of claim 21, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that none of the cited references alone teaches each and every element of claim 21, as required by 35 U.S.C. § 102(b). Moreover, the Examiner admits that *Toprac* does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither *Payne* nor *Knoot* overcomes the deficiency of *Toprac*. Also, *Yonezawa*, *Shoham*, and *Egermeier* do not cure the deficiencies of *Toprac*, *Payne*, and *Knoot*.

The Applicant submits that, as stated above, the references, alone or combined, do not teach, show, or suggest each and every element recited in independent claim 18, and claim 21 dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 50-59 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Grimbergen et al* (U.S. Patent No. 6,390,019) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and further in view of *Cha et al* (U.S. Patent No. 6,319,767) and *Yu* (U.S. Patent No. 6,368,982). The Examiner asserts that the combined references teach all the elements of claims 50-59 and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that *Grimbergen* does not disclose details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither *Payne* nor *Knoot* overcomes the deficiency of *Grimbergen*. Also, *Cha* and *Yu* do not cure the deficiencies of *Grimbergen*, *Payne*, and *Knoot*.

The Applicant submits that, as stated above, the references, alone or combined, do not teach, show, or suggest each and every element recited in claim 50, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

Claims 50-59 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Toprac* (U.S. Patent No. 6,379,980) or *Klippert II et al* (U.S. Patent No. 6,136,712) or *Petrucci et al* (WO 01/24254) in view of *Payne* (U.S. Patent No. 5,329,381), *Knoot* (U.S. Patent No. 6,130,415) and further in view of *Cha et al* (U.S. Patent No. 6,319,767) and *Yu* (U.S. Patent No. 6,368,982). The Examiner asserts that the combined references teach all the elements of claims 50-59, and that it would have been obvious to one of ordinary skill in the art to combine all these teachings to produce the claimed invention. The Applicant respectfully traverses the rejection.

The Examiner admits that *Toprac*, *Klippert II*, nor *Petrucci* discloses details of the measurement technique, noise elimination in the signal, or use of modulated radiation. For reasons stated above, neither *Payne* nor *Knoot* overcomes the deficiencies of *Toprac*, *Klippert II*, and *Petrucci*. Also, *Cha* and *Yu* do not cure the deficiencies of *Toprac*, *Klippert II*, *Petrucci*, *Payne*, and *Knoot*.

The Applicant submits that, as stated above, the references, alone or in combination, do not teach, show, or suggest each and every element recited in claim 50, and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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Keith M. Tackett  
Registration No. 32,008  
PATTERSON & SHERIDAN, L.L.P.  
3040 Post Oak Blvd. Suite 1500  
Houston, TX 77056  
Telephone: (713) 623-4844  
Facsimile: (713) 623-4846  
Attorney for Applicant(s)